

## TWO NEW ECHIUROIDS (Echiuroidea) FROM AUSTRALIA

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### SUMMARY

Two new echiuroids are described from Australia, *Listriolobus bulbocaudatus* from Moreton Bay, Queensland, and *Ochotostoma myersae* from Long Reef, New South Wales. A key to the genera of Australian echiuroids is also given.

#### *Listriolobus bulbocaudatus* n. sp.

(Plate 1, Fig. 1)

*Listriolobus* Fischer, 1926, p. 110; Fisher, 1946, p. 233.

*Material*: Four specimens dredged from 8-10 fathoms, west of Mud Island, Moreton Bay (Queensland): coll. Prof. W. Stephenson (University of Queensland), Aug., 1962.

*Description*: The specimens are sausage-shaped. The length of the trunk is 48-80 mm. and the maximum width is 14-20 mm. The proboscis (still attached to the body in all specimens) is, in the preserved condition, short, stout and rounded, about 10-16 mm. long and about as wide. The trunk is dark reddish-brown but the proboscis is much lighter in colour. A feature of all the specimens is that the posterior extremity of the trunk is expanded into a fleshy, bulbous structure, light pink in colour like the proboscis. The bulb is slightly pointed posteriorly and bears a number of rings of very large, prominent, wart-like papillae. The trunk is covered with whitish papillae that are easily discernible to the naked eye. They are closely packed posteriorly and anteriorly and largest posteriorly.

In three of the specimens the longitudinal muscles are grouped into seven bundles that are best seen on dissection. The body wall of the other specimen, the smallest, is very thin and the muscle bands are not as well-defined. The oblique musculature between the longitudinal bands is not grouped into fascicles as it is in the genus *Ochotostoma*. There are two relatively long setae connected internally by a well-developed interbasal muscle. There is a well-developed mesentery attached to the anterior part of the oesophagus and the body wall.

The alimentary canal is very long and much coiled and contains sausage-shaped faecal pellets. The walls of the pharynx, oesophagus, gizzard and crop are thicker than those of the intestine. The siphon is not very prominent. There is a caecum near the posterior extremity of the alimentary canal and a ventral, ciliate groove which terminates at the caecum.

The nephridia arise behind the setae. In the two smaller specimens there are two pairs but in the larger specimens there are three nephridia on the left

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side and two on the right side (dorsal view). No trace of a third on the right side was discernible. The presence of this extra nephridium is difficult to explain. Fisher (1946, p. 222) reported the presence of three nephridia on one side and two on the other in a species of *Lissomyema* (*Thalassema*) *mellita* Conn. *L. mellita* is regarded as possessing two pairs of nephridia. In the Queensland specimen the region of the nephridia near the body wall is globular in shape, the rest tubular. The nephrostomal lips of all the nephridia are very long and much coiled, much more so than those of *L. hexamyotus* Fisher (1949, plate 29) and *L. pelodes* Fisher (1946, plate 22).

The blood system resembles that of *L. pelodes*. The intestinal vessel makes contact with the crop where it expands into a thin-walled structure of large diameter. There is a ring vessel which gives off two neuro-intestinal vessels that join before they reach the interbasal muscle and then, in two specimens at least, bifurcate to form a loop around the muscle. The ventral vessel runs close to the nerve cord and terminates at the rectal caecum.

The anal vesicles are long, thin and brown in colour. They are not swollen near the rectum. They bear numerous small ciliate funnels with short stalks.

*Systematic Position:* These specimens fall into the genus *Listriolobus* (Fisher, 1949, p. 480). They differ from *L. hexamyotus* Fisher (1949) which has six longitudinal muscles and one pair of nephridia, from *L. bahamensis* (Fischer, 1926) which has 16 longitudinal muscles, from *L. pelodes* (Fisher, 1946) which has eight bands, from *L. riukiensis* Sato, 1939, which has twelve bands, and from *L. sorbillans* (Lampert, 1883), already reported from Sydney by Augener (1903, p. 349), which has thirteen muscles. A near species is *Thalassema formulosum* Lampert, 1883, which Fisher (1946) placed in the genus *Ochetostoma*. It has 7-8 muscle bands, two pairs of nephridia with spirally-coiled nephrostomal lips and sparsely distributed white papillae. Fisher, however, must have had evidence that the oblique musculature between the muscle bands was grouped into small bundles. Neither Lampert (1883) nor Wharton (1913) mention the posterior swelling of the trunk in their description of *T. formulosum*. *Thalassema exilii* F. Muller has 8-10 muscles and two pairs of nephridia. Its nephrostomal lips are folded and crinkled but not elongated. Fisher (1946, p. 24) thinks that it is probably a *Lissomyema*.

Through the kindness of the authorities of the U.S. National Museum, Washington, I have been able to compare these specimens with a dissected specimen of *L. pelodes*. The latter, U.S.N.M. Cat. No. 20622, was collected at Tomales Bay and identified by Fisher. Most of its internal structures were damaged. The specimen, however, lacks the bulb and posterior rings of papillae that are found on all the Australian animals and its proboscis is long and thin.

Consequently it seems reasonable to regard these specimens from Queensland, although close to *L. pelodes*, *O. formulosum* and *T. exilii*, as new. It is of interest to note that *L. bulbocaulatus* was dredged from a mud bank very much as *L. pelodes* was by Barnard and Hartman (1959) in California.

*Diagnosis:* Body sausage-shaped and proboscis short and stout. In older specimens the longitudinal musculature is grouped into seven bundles; in younger specimens this is not so apparent. Oblique musculature between the longitudinal muscles not grouped into small bundles. Two pairs of nephridia arise behind the setae. In the two largest specimens there are three nephridia on one side and two on the other. A stout fastening mesentery is connected

to the oesophagus. Posterior region of the trunk is swollen into a light-pink, fleshy, bulb-like structure. Body covered with whitish papillae which are warty and arranged in a number of rings on the posterior swelling.

*Type Specimen*: Australian Museum, Sydney.

*Type Locality*: Mud Island in Moreton Bay, Queensland.

*Ochetostoma myersae* n.sp.

(Plate 1, Fig. 2)

*Ochetostoma* Louckart and Ruppell, 1828; Fisher, 1946, p. 240.

*Specimens*: Four (three dissected), Aust. Museum collection W 3757.

*Locality*: Long Reef, near Sydney, New South Wales. Collected by Miss D. Myers, 20-4-62.

*Description*: The specimens are sac- or sausage-shaped. The anterior region of the trunk tends to be rounded while the posterior region is more pointed. The animals were described by the collector as being "chlorophyll green" in colour. Preserved in alcohol they are pink. The length of the trunk is 20-35 mm. and the maximum width 9-15 mm. The surface of the trunk is covered with soft, white, wart-like papillae which are largest and most noticeable in the posterior third. The proboscis, which was still attached in three specimens, is about a quarter to half the length of the trunk. It tapers slightly anteriorly and in the fixed specimen is almost tubular in shape.

The longitudinal muscles are grouped into 18-21 bundles that are usually visible externally but which are best counted in dissected specimens. In two specimens two muscles anastomose. The longitudinal muscles lie close together and are most strongly developed over the anterior half or two-thirds of the trunk. The oblique muscles between the longitudinal bands are grouped rather weakly into fascicles and not into such strongly developed bundles as they are in *O. australiense* Edmonds (1960). There are two pairs of nephridia which lie posterior to the setae. The nephrostomes are expanded into two elongate, thread-like lips which are rather weakly coiled. In the largest specimen only one pair of nephridia could be found. The nephridia of this specimen were larger than those of the other two dissected specimens and not as coiled as those shown for *O. edax* Fisher (1946, p. 14). This variation in the number of nephridia is puzzling. There seems no doubt, however, that since all the specimens look alike and were collected at the same time and in the same locality they belong to the same species. There are two prominent setae and a strong interbasal muscle. Three or four strong and prominent muscles connect each seta and the body wall. The alimentary system consists of (1) a comparatively short foregut which extends as far as the ring vessel of the vascular system, (2) a thicker intestine with a ciliate groove and a collateral intestine, and (3) a short rectum which bears a small caecum. The contents of the canal are very coarse and not formed into pellets. The vascular system consists of a dorsal vessel, a ring vessel, two neuro-intestinal vessels and a ventral vessel. The neuro-intestinal vessels join and then split again to enclose the interbasal muscle. The anal vessels are long and thin and do not branch. The ciliate funnels are borne on very short stalks.

*Systematic Position*: These specimens closely resemble *O. baronii* (Greef, 1879) and *O. edax* Fisher, 1946. *O. baronii* possesses 17-19 longitudinal muscle bands and *O. edax* 16 or 17. Short branching outgrowths are present on the

anal vesicles of *O. baronii*. Such structures are not present in the specimens from Long Reef. Fisher (1946) says that the normal number of muscle bands of *O. edax* is probably 16. Through the kindness of the authorities of the U.S. National Museum, Washington, I have been able to compare the Australian specimens with a specimen of *O. edax* from Puerto Refugio (U.S.N.M. Cat. No. 20623). It was identified by Fisher. It is a small specimen with a deciduate proboscis. It possesses fewer longitudinal muscles than the Australian specimens, its body wall is much thinner and the papillae are more prominent, especially in the mid-region of the trunk. Consequently the specimens from Long Reef are considered to be different from *O. edax* and new. *O. myersae* differs from *O. australiense* Edmonds, 1960, in the number of its longitudinal muscles and in the number and position of its nephridia.

*Diagnosis:* Trunk sac- or sausage-shaped, posterior region somewhat pointed. Trunk bears numerous white, wart-like papillae which are most noticeable on the surface of the posterior third. Proboscis not readily deciduate, about a quarter to half the length of the trunk and tapering slightly anteriorly. 18-21 longitudinal bundles, placed closely together. Oblique muscles between the bundles weakly developed. Two pairs of nephridia which lie posterior to the setae (one specimen has only one pair of nephridia). Nephrostomal lips elongate and weakly coiled. Two prominent setae and a strong interbasal muscle. Rectal caecum. Contents of alimentary canal very coarse and not formed into pellets. Vascular system as in *O. australiense* and *O. edax*. Anal vesicles long, thin and unbranching. Ciliate funnels on very short stalks. When alive chlorophyll green in colour.

*Type Specimen:* Australian Museum, Sydney.

*Type Locality:* Long Reef, near Sydney, New South Wales.

## KEY TO THE GENERA OF AUSTRALIAN ECHIUROIDS

*This key replaces the one given in Edmonds, 1960*

1. Proboscis usually conspicuous (although sometimes deciduous if specimen is handled) and often several times the length of the body but never bifid. Anal vesicles long, sac-like, unbranched and covered with minute ciliate funnels — family *Echiuridae* ..... 3, 4
2. Females with elongate, bifid proboscis. Anal vesicles with many branches that end in ciliate cups. Male degenerate, living in or on the female — family *Bonellidae* ..... 11, 12
3. Longitudinal muscles of body-wall grouped into bundles ..... 5, 6
4. Longitudinal muscles of body-wall not grouped into bundles ..... 7, 8
5. The interval between the bundles is crossed by numerous separate, small bundles of the inner oblique layer. Nephridia with spirally coiled, nephrostomal lips — genus *Ochetostoma*.
6. The interval between the bundles is not crossed by numerous separate, small bundles of inner oblique layer; nephrostomal lips elongate and spirally coiled — genus *Listriolobus*.
7. Nephrostomal lips either coiled or expanded into leaf-like structures ..... 9, 10
8. Nephrostomal lips neither coiled nor expanded into leaf-like structures — genus *Thalassema*.
9. Nephrostomal lips long and spirally coiled — genus *Anelassorhynchus*.

10. Single pair of nephridia with nephrostomal lips produced to form leaf-like structures. Proboscis long, deciduous and slender with a small fan-like extremity — genus *Arhynchite*.
11. Only one nephridium or uterus present. Coelomic aperture of the nephridium is situated near the base of nephridium at the end of a short lateral tube — genus *Bonellia*.
12. More than one nephridium or uterus „ . . . . . 13, 14
13. Two nephridia or uteri with nephrostomes placed near their distal ends. Male permanently lodged in a small blind tube which opens between the nephridiopores — genus *Pseudobonellia*.
14. Third nephridium placed between two paired nephridia — genus *Archibonellia*.

## REFERENCES

- AUGENER, H., 1903. Beiträge zur Kenntnis der Cephyreen nach Untersuchung der im Göttinger zoologischen Museum befindlichen Sipunculiden und Echiurden. Arch. f. Naturgesch. (1), 3, pp. 207-370.
- BARNARD, J. C., and HARTMAN, O., 1959. The sea bottom off Santa Barbara, California. Biomass and Community structure. Pacific Naturalist, (1), 6, pp. 1-15.
- EDMONDS, S. J., 1960. Some Australian echiuroids (Echiuroidea). Trans. Roy. Soc. S. Aust., 83, pp. 89-98.
- FISCHEB, W., 1926. Sipunculiden und Echiuriden der Hamburger Südsee-Expedition 1908-1909. Mitt. zool. Staatsinst und zool. Mus, Hamb., 42, pp. 109-117.
- FISHER, W. K., 1946. Echiuroid worms of the north Pacific Ocean. Proc. U.S. Nat. Mus., 96, pp. 215-292.
- FISHER, W. K., 1949. Additions to the echiuroid fauna of the north Pacific Ocean. Proc. U.S. Nat. Mus., 99, pp. 479-497.
- LAMPERT, K., 1883. Über einige neue Thalassema. Zeitschr. wiss Zool., 39, pp. 334-342.
- SATO, H., 1939. Studies on the Echiuroidea, Sipunculoidea and Priapulioidea of Japan. Sci. Rep. Tohoku Imp. Univ. Ser., 4 (14), pp. 339-460.
- WHARTON, L. D., 1913. A description of some Philippine *Thalassema* with a revision of the genus. Phil. Journ, Sci. Ser. D (8), pp. 243-270.